

Appl. No. 09/982,363  
Amdt. Dated Aug. 15, 2005  
Reply to Office Action of Jun. 28, 2005

### Remarks

#### Claim Rejections Under 35 U.S.C. 103

Claims 1-8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 6,249,625) in view of Li (US 6,477,289). Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 6,249,625) in view of Li (US 6,477,289) and further in view of Chang et al (US 6,792,211).

In response to these rejections, applicant has amended independent claims 1 by adding the limitation of claims 5 and 6 thereinto, in order to patentably define the claimed invention over the prior art cited by Examiner. Applicant has accordingly canceled claims 5 and 6 without prejudice. Regarding claim 17, applicant has amended independent claims 17 by adding the limitation of claim 18 thereinto, in order to patentably define the claimed invention over the prior art cited by Examiner. Applicant has accordingly canceled claim 18 without prejudice.

Regarding claim 1, the present invention includes an optical add-drop multiplexer comprising: a first ferrule with an input optical fiber and an output optical fiber stationed therein; ...; an optical crystal having a profile of a generally regular hexagon or an egg-timer shaped hexagon; ...; wherein the first graded index lens, the bandpass filter, the optical crystal and the second graded index lens are successively placed between the first and the second ferrules, an optical multiplexed signal from the input optical fiber is transmitted to the bandpass filter, from which an optical signal having a wavelength identical to the central wavelength of the bandpass filter is output to the dropping optical fiber, and other optical signals having other wavelengths

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are coupled with an optical signal from the adding optical fiber having a wavelength identical to the central wavelength of the bandpass filter and are transmitted to the output optical fiber.

Firstly, as indicated by Examiner, Pan fails to disclose "an optical crystal." Also, Pan fails to disclose "an optical crystal having a profile of a generally regular hexagon or an egg-timer shaped hexagon." Applicant acknowledges that Li discloses an add/drop multiplexer having a refractive element 102 (col. 7, line 31). However, Li does not teach or suggest that the refractive element 102 is an optical crystal, as recited in claim 1 of the present invention. Also, there is no suggestion that the refractive element 102 can be used in the add/drop multiplexer of Pan. McLeod discloses a crystal 30 (paras. 0038 and 0040). However, there is no teaching or suggestion in McLeod that the crystal 30 could have a profile of a generally regular hexagon or an egg-timer shaped hexagon. Therefore, Pan, Li and McLeod fail to disclose or suggest "an optical crystal having a profile of a generally regular hexagon or an egg-timer shaped hexagon."

Secondly, as shown in Figs. 3A, 3B and 4 and understood by applicant, Li discloses an optical wedge switch that includes a refractive element 102 having a profile of a pentagon. The refractive optical element could be an optical wedge (col. 2, lines 24-25). A face of the optical wedge is essentially normal to a light signal from an optical input. A second face of the optical wedge has a first portion that is essentially parallel to the first face, and a second portion that is angled to the first face. In a first switch position, the light signal passes through the first face and the first portion of the second face to be transmitted with refraction of essentially zero degrees (col. 2, lines 40-48, summary of Li). From these descriptions in Li, it can be concluded that the refractive element 102 is a pentagon. Thus it is not conceivable that one skilled

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in the art would be motivated to modify the refractive element 102 of Li to arrive at an optical crystal having a profile of a generally regular hexagon or an egg-timer shaped hexagon, as provided in claim 1 of the present invention. In addition, the whole of Li does not disclose, teach or suggest that the refractive element 102 can be any other shape except a pentagon. Therefore, to use an optical crystal having a profile of a generally regular hexagon or an egg-timer shaped hexagon is not merely an engineering design choice. In summary, there is no suggestion or motivation for one skilled in the art to combine Pan with Li in order to arrive at claim 1 of the present invention.

In conclusion, applicant asserts that independent claim 1 is patentable under 35 U.S.C. 103 over Pan in view of Li. Reconsideration and removal of the rejection are requested.

Regarding claim 8, the present invention includes a multicenter optical add-drop multiplexer module comprising a plurality of optical add-drop multiplexers sequentially connected together from the first to the last, each optical add-drop multiplexer comprising: a first ferrule with an input optical fiber and an output optical fiber stationed therein; ...; an optical crystal; a second graded index lens; and a second ferrule having an adding optical fiber and a dropping optical fiber stationed therein; wherein the first graded index lens, the bandpass filter, the optical crystal and the second graded index lens are successively placed between the first and the second ferrules, an optical multiplexed signal from the input optical fiber is transmitted to the bandpass filter, from which an optical signal having a wavelength identical to the central wavelength of the bandpass filter is output to the dropping optical fiber, and other optical signals having other wavelengths are coupled with an optical signal from the adding optical fiber having a wavelength identical to the central wavelength of the bandpass filter and are transmitted to the output

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optical fiber. As indicated by Examiner, Pan fails to disclose "an optical crystal." Similarly, Li does not teach or suggest "an optical crystal". Applicant acknowledges that Li discloses an add/drop multiplexer having a refractive element 102 (col. 7, line 31). However, Li does not teach or suggest that the refractive element 102 is an optical crystal as recited in claim 1 of the present invention. Therefore, both Pan and Li fail to disclose "an optical crystal".

Secondly, Li fails to disclose, teach or suggest that the refractive element 102 can be used in the add/drop multiplexer of Pan. In applying Li to Pan, one of ordinary skill in the art would not have been led to provide an optical add-drop multiplexer of claim 1 of the present invention comprising an optical crystal. Therefore, there is no suggestion or motivation for one skilled in the art to combine Pan with Li in order to arrive at the present invention.

Secondly, Li fails to disclose, teach or suggest that the refractive element 102 can be used in the add/drop multiplexer of Pan. In applying Li to Pan, one of ordinary skill in the art would not have been led to provide an optical add-drop multiplexer of claim 8 of the present invention comprising an optical crystal. Therefore, there is no suggestion or motivation for one skilled in the art to combine Pan with Li in order to arrive at the present invention.

Thirdly, Pan fails to disclose "other optical signals having other wavelengths are coupled with an optical signal from the adding optical fiber having a wavelength identical to the central wavelength of the bandpass filter and are transmitted to the output optical fiber." Similarly, Li fails to disclose, teach or suggest "other optical signals having other wavelengths are coupled with an optical signal from the adding optical fiber having a wavelength identical to the central

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wavelength of the bandpass filter and are transmitted to the output optical fiber. That is, both Pan and Li do not disclose "other optical signals having other wavelengths are coupled with an optical signal from the adding optical fiber having a wavelength identical to the central wavelength of the bandpass filter and are transmitted to the output optical fiber". It is impossible to teach or suggest "other optical signals having other wavelengths are coupled with an optical signal from the adding optical fiber having a wavelength identical to the central wavelength of the bandpass filter and are transmitted to the output optical fiber". Therefore, it can be obviously seen that there is no suggestion or motivation for one skilled in the art to combine Pan with Li in order to arrive at the present invention.

In conclusion, applicant asserts that independent claim 8 is patentable under 35 U.S.C. 103 over Pan in view of Li, and requests that the rejection be removed.

Claim 17 of the present invention now includes an optical changing assembly comprising: at least one unit including: a first ferrule holding a first input fiber and a first output fiber therein; ...; an optical crystal positioned between and beside said first GRIN lens and said second GRIN lens; ...; simultaneously a second light coming from the second input fiber includes another signal of  $\lambda$  hitting the crystal and being refracted by said crystal, toward and entering the first output fiber to join the reflected first light; wherein two or more units are assembled sequentially one adjacent another, and wherein the first output fiber of one unit is connected to the first input fiber of the next unit, and the second output fiber of said one unit is connected to the second input fiber of said next unit.

Applicant acknowledges that Chang discloses a compact optical

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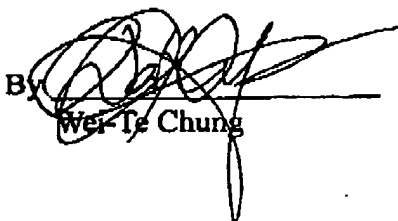
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wavelength add/drop multiplexer having more than unit assembled sequentially one adjacent another, with the first output fiber of one unit being connected to the first input fiber of the next unit (FIGS. 3A and 3B). However, Chang fails to disclose that "the second output fiber of said one unit is connected to the second input fiber of said next unit." Similarly, both Pan and Li fail to disclose that "the second output fiber of said one unit is connected to the second input fiber of said next unit." Thus any combination of Pan and Li with Chang does not teach or suggest that "the second output fiber of said one unit is connected to the second input fiber of the said next unit." In other words, there is no suggestion or motivation for one skilled in the art to combine Pan and Li with Chang in order to arrive at claim 17 of the present invention.

In summary, Pan in view of Li and further in view of Chang et al would not reasonably yield the optical changing assembly as recited in claim 17. That is, claim 17 is patentable under 35 U.S.C. 103 over the three cited references.

In view of the above remarks, the subject application is believed to be in a condition for allowance, and an action to such effect is earnestly solicited.

Respectfully submitted,  
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By   
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